chapters, and another equally to be commended is on "Plants and Plant Communities as Indicators" [of climate, soil, overgrazing, forest and agricultural possibilities].

Throughout the entire book there is evidence of the highest scholarship and painstaking desire for accuracy. The work is likely to be a standard text-book in ecology for many years to come.

Typographically, the volume is well-nigh perfect; one would need to seek far for a more satisfactory example of the printer's art.

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*Grundlinien der experimentellen Planktonforschung.* By EINAR NAUMANN. Bd. VI of Thienemann's Binnengewässer, 1929, 100 pp., 18 figs. Published by E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart.

IN 1908 a limnological laboratory was established at Aneboda, Sweden, in the midst of a series of lakes whose waters contain a great deal of humus. As might be expected the chief activity of this station has been a study of the relation of these humic waters to the biota of the lakes, more especially to the plankton organisms found therein. These studies have involved a large amount of experimental work and the present book is based in a large measure upon these investigations. The author emphasizes the point, however, that actual observations on the lake must go hand in hand with the experimental work in order to secure reliable results.

The first two sections of the book contain brief descriptions of the Aneboda laboratory and its equipment, including the apparatus used for getting samples of the water and of the plankton; the remainder of the book is devoted to a discussion of methods of experimentation upon plankton organisms. Such topics as the vital staining and narcotizing of zooplankton forms, the use of various organisms as indicators for testing the different types of water, the regulation of the reaction and of the dissolved substances in the water used for experimental purposes, and the control of such factors as light, temperature and the mechanical agitation of the water are discussed in some detail. Culture media for rearing different kinds of algae are given, as well as the kinds of food best suited to the various zooplankton forms. The book is an important contribution to the experimental phase of limnological research.

The bibliography contains a list of 205 titles.

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# SCIENTIFIC APPARATUS AND LABORATORY METHODS

## A SIMPLE METHOD FOR FINDING ANY PARTICULAR OBJECT IN A MICROSCOPIC SLIDE PREPARATION[1]

THE various methods proposed from time to time for locating particular fields of a microscopic slide, although fairly satisfactory for work with the low power, are not sufficiently accurate for high-power or oil-immersion work. In all the methods yet proposed, random search, although in limited areas which are determined in various ways, as by readings of mechanical stages, is necessary. The following simple method in which random search is eliminated was thought of a number of years ago. It has proved so satisfactory in my hands in locating organisms difficult of demonstration in stained smears or sections that its description seems worth while. The diplococci represented in the accompanying sketch, for instance, were found in a section of the spinal cord of a monkey in which poliomyelitis developed following injection of virus, and it was very desirable to be able to locate the organisms at will.

The method consists simply of the use of a blank slide, on one side of which is pasted a fairly thin sheet of gummed paper trimmed accurately along the edges of the slide. On either end of this a circle is drawn with a five-cent piece (2.2 cm in diameter). When a micro-organism or another object of particular importance which is to be photographed or demonstrated later is found, a rough sketch (Fig. 1) of the high-power (*H.P.*) of oil-immersion field is drawn in the circle at the left end, and a rough sketch of the low-power (*L.P.*) field in the circle at the right end of the paper-covered slide. In each case, the object of interest is drawn and its position relative to particularly conspicuous material is indicated. Examples of such conspicuous material are masses of pigment, partitions, margins of section, ganglion cells, round cells, (*R.C.*), blood vessels (*B.V.*), and central canal (*C.C.*). The same is done if the slide preparation is a smear instead of a section.

The slide in which a field of special interest has been found is then removed from the mechanical stage and the paper-covered slide, on which the high-power and low-power sketches have been drawn, is put in its place; it is necessary to make sure that the mechanical stage is not jarred and that the slide is in the proper position. A dot is then made with pen and ink as nearly as possible in the center of the bright area transmitted from the condenser. The low-

[1] Submitted for publication April 15, 1929.

power lens is then focused on the dot and its situation in the field noted. The paper-covered slide is then removed and the situation of the dot in relation to the field is indicated with a small circle around the dot (*o.k.*). The dot illustrated in Fig. 1 was far to the right of the center of the field. The paper-covered indicator slide is then numbered to correspond to the slide containing the prized field and both are filed away together for future reference. If more than one interesting field is found in the same slide, any number of additional indicator slides may be used.

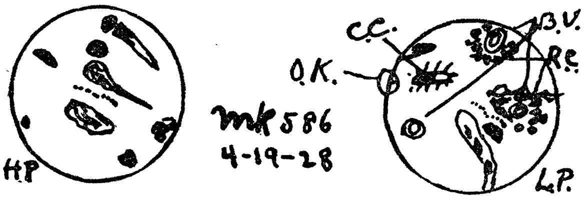


FIG. 1. Paper-covered indicator slide on which the object of interest, the chain of diplococci, is sketched in its relation to conspicuous objects in the high-power and low-power fields.

To find the particular field or fields later, the indicator slide is put in place, and the dot brought to the relative position in the low-power field as indicated by the circle surrounding it. The slide containing the object is then put in its place, the low-power field is oriented, and the object of interest brought to the center of the field, as indicated by the sketch shown in Fig. 1. The high-power or oil-immersion lens is then turned into position and the prized object is almost always within the field, and if not it can readily be located.

It is desirable that the fixed end of the mechanical stage of the microscope used for photography or demonstration be the same as the one used when the field was first found because microscopic slides are usually not of exactly the same length.

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# SPECIAL ARTICLES

## STUDIES OF MEAN SEALEVEL

IN a former issue of this journal[1] there appeared a brief account of sealevel studies undertaken in New York waters to test the theory, advanced by the writer, that along an irregular coast mean sealevel is an irregular surface the precise elevation of which varies with changes in the form of the shore. The studies were carried on under the direction of the division of geology and geography of the National Research Council and have recently been completed. The ultimate success of the undertaking must be credited to several agencies which generously cooperated with the National Research Council to make the study possible, particularly the U. S. Coast and Geodetic Survey, which bore the major burden in the joint effort. A full report will be published in the near future covering (a) the theoretical considerations upon which the whole study was based; (b) the tidal observations, including full field data, prepared by Mr. Paul Schureman, of the Coast and Geodetic Survey, for possible use by those who fifty, a hundred or more years hence may wish to make similar observations for purposes of comparison; and (c) the interpretation of results of the tidal observations, especially in relation to problems of more than local interest.

The outstanding results of the tidal observations to be described in the report are as follows:

(a) The tidal range within Jamaica Bay is greater than at Fort Hamilton near the head of the more open Lower (New York) Bay.

(b) Mean sealevel at all three stations in Jamaica Bay is higher than at Fort Hamilton.

(c) Even within the bay the plane of mean sealevel is not level, but is higher at the northeastern station than at the southern and western stations.

(d) Tidal observations at Fort Hamilton extending over a period of thirty-five years indicate no appreciable change in sealevel at that point during the period of observations.

Let us consider the significance of these points in the order named.

(a) Jamaica Bay was selected as the site of the tidal study here described, in part because it was believed that the breadth and the depth of the inlet would admit tidal waters freely and that the relatively small size of the bay, combined with the fact that much of its area is occupied by marshes and mud flats, would prevent the entering waters from spreading far. Hence it was not expected that this locality would present those extreme conditions encountered where a narrow and shallow inlet into a broad and deep bay or lagoon favors a very small tidal range and at the same time a distinctly higher mean sealevel inside the embayment. The fact that the tidal range in Jamaica Bay exceeds that at Fort Hamilton is sufficient indication that the tidal waters do enter and leave the bay with great freedom and show that the locality was well chosen as an example of moderate rather than extreme conditions favorable to variations in the height of mean sealevel. In this connection it should be noted that not only does high water in the bay rise higher than at Fort Hamilton,

[1] "Shoreline Investigations on the Atlantic Coast," SCIENCE, n. s., 65, pp. 4–7, 1927.